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Indian Standard

ESTIMATION OF LOSS OF ABSORPTIVE POWER OF ANODIC OXIDE COATINGS AFTER SEALING-DYE SPOT TEST WITH PRIOR ACID TREATMENT FOR ANODIZED ALUMINIUM AND ITS ALLOYS

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ESTIMATION OF LOSS OF ABSORPTIVE POWER OF ANODIC OXIDE COATINGS AFTER SEALING-DYE SPOT TEST WITH PRIOR ACID TREATMENT FOR ANODIZED ALUMINIUM AND ITS ALLOYS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15 February 1985, after the draft finalized by the Metallic and Non-Metallic Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Aluminium is used for manufacturing variety of products, like window and door frames, ships' masts, engraved name plates, domestic lighting fittings, curtain tracks, etc. In its base state, aluminium is prone to corrosion. Anodizing, however, renders it highly resistant, so a great deal of aluminium seen or handled is anodized. The process of anodizing is fairly easy to do but it needs perfection. Moreover, it is almost impossible to tell the quality of the finish just by looking. Anodic layer is very stable and is impermeable even with a low thickness provided it is properly sealed; but poor sealing even for a good thickness as much as 20-25 μm can render it useless.

0.3 This test is simple to apply and is hoped that it will be very important to the anodized industry, to manufacturers of the finished products and to the purchasers of these products.

0.4 This standard covers dye spot test with prior acid treatment for estimation of loss of absorptive power of anodic oxide coatings after sealing the anodized aluminium and its alloys. The resistance of anodic oxide coatings to absorption of dye may give information on the quality of sealing, total resistance indicating that the quality of sealing is good. Slight loss of resistance to absorption, however, does not necessarily mean that the sealing of the coating is poor; it may be a consequence of certain agents having been added to the sealing bath. In cases of doubt, the quality of sealing may be established by using a referee method such as that described in IS : 5523-1983*.

0.5 In the preparation of this standard assistance has been derived from ISO 2143-81 Anodizing of aluminium and its alloys — Estimation of loss of absorptive power of anodic oxide coatings after sealing — Dye spot test with prior acid treatment, issued by the International Organization for Standardization.

1. SCOPE

1.1 This standard specifies a method of estimating, by dye absorption after acid pre-treatment, the loss of absorptive power of anodic oxide coatings that have undergone a sealing treatment and provides a way of testing and assessing the degree of sealing.

2. FIELD OF APPLICATION

2.1 The method is applicable to all anodic oxide coatings to be subjected to weathering or to aggressive environments and in all cases, where resistance to staining is important.

2.2 The method is not applicable to coatings:

a) formed of alloys containing more than 2 percent copper or 4 percent silicon;

b) sealed by dichromate process;

c) that have been given any supplementary processing, for example, oiling, waxing or lacquering;

d) that are coloured in deep shades; and

e) that are less than 3 μm thick.

2.3 The method is less significant, if nickel or cobalt salts or organic additives have been added to the sealing bath.

3. PRINCIPLE

3.1 The method is based on the attack of an acid on a degreased area of the sample followed by application of a dyestuff and observation of the colouration obtained.

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*Methods of testing anodic coatings on aluminium.

4. REAGENTS

4.1 Unless specified otherwise, pure chemicals and distilled water in accordance with IS : 1070-1977* shall be employed in tests.

4.1.1 *Acid Solutions* — These solutions shall be stored in containers made of material resistant to fluorosilicic acid and shall be handled with care.

4.1.2 *Acid Solution A* — Prepare a solution containing 25 ml of sulphuric acid (density 1·84 g/ml at 20°C) and 10 g of potassium fluoride per litre.

4.1.3 *Acid Solution B* — Prepare a solution containing 25 ml of fluorosilicic acid (H_2SiF_6) (density 1·20 g/ml at 20°C) per litre.

4.2 Dye Solutions

4.2.1 *Dye Solution A* — Prepare an aqueous solution containing 5 g of aluminium blue 2LW (colour index Mordant Blue 69) per litre adjusted to *p*H 5·0 ± 0·5 at approx 23°C with dilute sulphuric acid solution or with dilute sodium hydroxide solution.

4.2.2 *Dye Solution B* — Prepare an aqueous solution containing 10 g of Sanodal Red B3 LW (colour index acid red 331) per litre, adjusted to *p*H 5·7 ± 0·5 at approx 23°C with dilute sulphuric acid solution or dilute sodium hydroxide solution.

5. TEST SPECIMENS

5.1 The test shall normally be carried out only on production articles. The use of specially prepared test specimens processed at the same time and in the same manner as production articles can lead to erroneous results.

6. PROCEDURE

6.1 Clean the surface to be tested and remove any grease with a piece of cotton wool soaked in acetone. Apply one drop of acid solution, or acid solution B at approximately 23°C to the horizontal, clean and dry surface and allow it to remain for exactly 1 minute. Remove the drop of acid and wash and dry the test surface.

6.1.1 Apply one drop of dye solution A or dye solution B, to the spot treated with acid solution and allow it to remain for 1 minute. Wash off the drop of dye and thoroughly clean the surface of the test area by rubbing with a clean cloth soaked in water and a light abrasive (magnesia, whiting or an equivalent abrasive) for 20 seconds, rinse thoroughly and dry.

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*Specification for water for general laboratory use (*second revision*).

6.1.2 Examine the test area and assess the colour intensity of the stain as given in Table 1.

7. EXPRESSION OF RESULTS

7.1 The loss of absorptive power shall be expressed in accordance with the classification as given in Table 1.

8. TEST REPORT

8.1 The test report shall include the following information:

a) Reference to this standard;

b) Type of test specimen used;

c) Anodizing specification (where possible);

d) Acid treatment used in the test;

e) Colour of the dye solution used in the test;

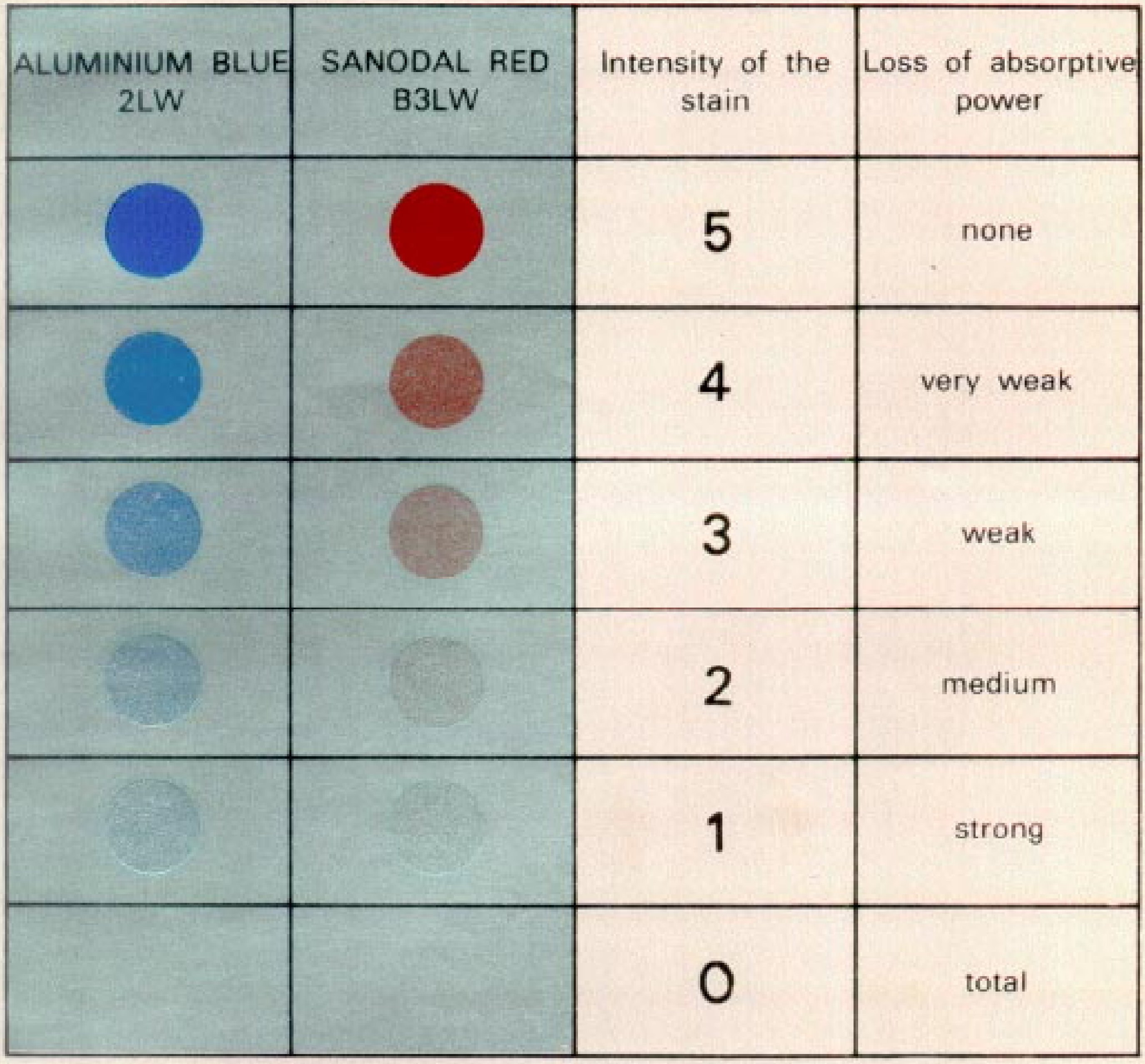
f) Loss of absorptive power, or the colour intensity of the stain in accordance with Table 1; and

NOTE — Acceptance levels will normally be specified in the relevant product specification.

g) Any other observations concerning the conduct of the test or of the nature of the stain area (for example, uneven density of staining).

TABLE 1 INTERPRETATION OF THE RESULTS OF THE DYE SPOT TEST BY USING DYE SOLUTION A AND B

(*Clauses* 6.1.2, 7.1 *and* 8.1)



ALUMINIUM BLUE 2LW	SANODAL RED B3LW	Intensity of the stain	Loss of absorptive power
●	●	5	none
●	●	4	very weak
●	●	3	weak
●	●	2	medium
●	●	1	strong
		0	total